Metadata for Voyageurs National Park, Spatial Vegetation Data: Cover type / Association level of the National Vegetation Classification System

Identification_Information:
Citation:
Citation_Information:
Originator:
U.S. Geological Survey, Upper Midwest Environmental Sciences Center, 2630 Fanta Reed Road, La Crosse, Wisconsin 54603
Publication_Date: 200102
Title:
Vegetation Spatial Database Coverage for the Voyageurs National Park Vegetation Mapping Project
Geospatial_Data_Presentation_Form: database
Series_Information:
Series_Name: USGS-NPS Vegetation Mapping Program
Issue_Identification: Voyageurs NP Vegetation Mapping Project
Publication_Information:
Publication_Place: Denver, Colorado
Publisher: U.S. Geological Survey, Center for Biological Informatics
Other_Citation_Details:
The spatial database was prepared by the U.S. Geological Survey (USGS) Upper Midwest Environmental Sciences Center (UMESC) for the USGS-NPS Vegetation Mapping Program. The Nature Conservancy (TNC) and their affiliates (Association for Biodiversity Information (ABI) and Minnesota County Biological Survey (MCBS) of the Minnesota Department of Natural Resources) provided ecological and vegetation classification support.
Online_Linkage: http://biology.usgs.gov/npsveg/voya/index.html#geospatial_veg_info
Larger_Work_Citation:
Citation_Information:
Originator:
U.S. Geological Survey, Upper Midwest Environmental Sciences Center
Publication_Date: 200102
Title:
Voyageurs National Park Vegetation Mapping Project, USGS-NPS Vegetation Mapping Program
Geospatial_Data_Presentation_Form: data information for Voyageurs National Park
Series_Information:
Series_Name: USGS-NPS Vegetation Mapping Program
Issue_Identification: Voyageurs NP Vegetation Mapping Project
Publication_Information:
Publication_Place: Denver, Colorado
Publisher: U.S. Geological Survey, Center for Biological Informatics
Other_Citation_Details:
The Voyageurs National Park Vegetation Mapping Project is part of the USGS-NPS Vegetation Mapping Program, which is managed by the USGS Center for Biological Informatics. The USGS UMESC provided project coordination and compiled all project data for distribution. The UMESC produced all spatial database sets: vegetation spatial database coverage, observation points, vegetation field plots, accuracy assessment, and various other ancillary spatial coverages. The UMESC also performed the accuracy assessment analysis of the vegetation spatial database coverage, prepared final project documentation discussing methods and results, and provided metadata reports. TNC and their affiliates (ABI and MCBS) provided ecological and vegetation support, vegetation field sampling (plot samples and accuracy assessment), data entry, vegetation analysis, methods documentation, and classification development (including community descriptions)

based on the U.S. National Vegetation Classification (USNVC). Voyageurs National Park provided staff to assist in field efforts, boat transportation, and knowledge of the local area.
Online_Linkage: http://biology.usgs.gov/npsveg/voya/
Description:
Abstract:
The vegetation spatial database coverage is of Voyageurs National Park and extended environs, covering 156,886 hectares (387,674 acres). Voyageurs National Park comprises 88,244 hectares (218,055 acres) of the total coverage area (56%). Almost 33,000 polygons make up the coverage, each with map unit description and physiognomic attribute information. The database provides crosswalk information to all USNVC floristic and physiognomic levels and several other classification systems (ecological groups/subgroups, Minnesota communities, NW Ontario forest and wetland ecosystems, USGS land use/land cover). A total of 50 USNVC associations make up the vegetation at Voyageurs National Park and environs. With all vegetation types, land use classes, and park specific categories combined, a total of 67 map units define the ground features within the project area. Applicable physiognomic modifiers define each vegetation map unit in more detail about the vegetation structure within a polygon (density, pattern, height, dominance). The spatial database was produced from the interpretation of fall 1995 and 1996 1:15,840-scale color infrared (CIR) aerial photographs. The interpreted data were transferred and automated using base maps produced from USGS digital orthophoto quadrangles (DOQ's) or using Ontario Basic Mapping Series (OBM) topographic maps. About 92% of the spatial coverage is produced using the DOQ-based maps. The finished spatial database is a single seamless coverage. The estimated overall thematic accuracy for vegetation map units is 82.4%.
Purpose:
The vegetation spatial database coverage was produced for the Voyageurs National Park Vegetation Mapping Project, USGS-NPS Vegetation Mapping Program.
Supplemental_Information:
The coverage is also available as 2 separate database sets to reflect the different base map medium used during the automation process; the DOQ-based coverage (Voyageurs National Park, all the environs area within USA, and portions of the environs area within Canada) and OBM-based coverage (remaining portion of environs area within Canada).
Time_Period_of_Content:
Time_Period_Information:
Multiple_Dates/Times:
Single_Date/Time:
Calendar_Date: 19950927
Single_Date/Time:
Calendar_Date: 19960913
Single_Date/Time:
Calendar_Date: 19960914
Single_Date/Time:
Calendar_Date: 19961003
Currentness_Reference: ground condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: None planned
Spatial_Domain:
Description_of_Geographic_Extent: Voyageurs National Park and environs
Bounding_Coordinates:
West_Bounding_Coordinate: -93.25
East_Bounding_Coordinate: -92.437
North_Bounding_Coordinate: 48.644
South_Bounding_Coordinate: 48.281
Keywords:
Theme:
Theme_Keyword_Thesaurus: None
Theme_Keyword: Digital Spatial Database

Theme_Keyword: Vegetation Map
Theme_Keyword: Vegetation
Theme_Keyword: US National Vegetation Classification
Theme_Keyword: USNVC
Theme_Keyword: National Park
Place:
Place_Keyword_Thesaurus: None
Place_Keyword: Voyageurs National Park
Place_Keyword: Minnesota
Place_Keyword: USA
Place_Keyword: Ontario
Place_Keyword: Canada
Taxonomy:
Keywords/Taxon:
Taxonomic_Keyword_Thesaurus: None
Taxonomic_Keywords: US National Vegetation Classification
Taxonomic_Keywords: USNVC
Taxonomic_Keywords: Vegetation
Taxonomic_Keywords: Plant Community
Taxonomic_Keywords: Association
Taxonomic_System:
Classification_System/Authority:
Classification_System_Citation:
Citation_Information:
Originator:
Anderson, M., P. Bourgeron, M. T. Bryer, R. Crawford, L. Engelking, D. Faber-Langendoen, M. Gallyoun, K. Goodin, D. H. Grossman, S. Landaal, K. Metzler, K. D. Patterson, M. Pyne, M. Reid, L. Sneddon, and A. S. Weakley
Publication_Date: 1998
Title:
International classification of ecological communities: terrestrial vegetation of the United States. Volume II. The National Vegetation Classification System: list of types
Geospatial_Data_Presentation_Form: publication
Publication_Information:
Publication_Place: Arlington, Virginia, USA
Publisher: The Nature Conservancy
Other_Citation_Details:
U.S. National Vegetation Classification listing of physiognomic and floristic levels.
Online_Linkage: http://www.natureserve.org/
Online_Linkage: http://www.conserveonline.org/2001/03/p/en/vol1.pdf
Classification_System_Modifications:
All physiognomic and floristic levels are represented within the vegetation spatial database coverage.
Taxonomic_Procedures:
Plot sizes ranged from 20 x 20 m for forests and woodlands to 10 x 10 m for shrublands, herbaceous, and nonvascular vegetation. Plots were placed subjectively in the most representative part of each stand of vegetation. The vegetation was visually divided into strata, and height and cover abundance of each stratum was estimated. Cover of dominant life forms was also estimated to match methods used by the Minnesota Natural Heritage Program survey methods (e.g. total cover of evergreen trees or shrubs was recorded separately from cover of deciduous trees or shrubs (Norm Aaseng, personal communication, 1996). All the species of each stratum were listed (including mosses and lichens) and percent cover estimated using the Braun-Blanquet cover scale. Additional species within the vegetation unit or polygon that occurred outside of sampled plots (generally within 2 m of the plot border) were listed separately. Species that were not identifiable in the field were collected for later identification. Vegetation plot data were entered into the Minnesota Natural Heritage Program's plot database. Species were assigned standardized codes and names based on the PLANTS database (USDA, NRCS 1999). These data were transferred to the PLOTS database developed by the Nature Conservancy (TNC 1997) for final inclusion in this report. For the vegetation

analysis, the data were analyzed using the PC-ORD Multivariate Analysis package (McCune and Mefford 1997). The data were analyzed in a series of runs, partitioning the data into smaller sets based on clusters found in the larger data sets, until sufficient resolution was achieved. Multivariate analysis was done using both Non-metric Multidimensional Scaling or NMS (Clarke 1993) and Cluster Analysis. A Bray-Curtis ordination was used as a starting point for the NMS and Ward's Method was used in the Cluster Analysis. These were then reviewed and assessed for perceived environmental gradients (e.g. moisture gradients, peat depth, soil depth, etc.). Indicator Species Analysis (Dufrene and Legendre 1997) was used to identify indicator species and to assess the reassignment of plots into different cluster analysis groups. These groups were compared with the USNVC (Faber-Langendoen et al. 1996, Grossman et al. 1998), as well as to northwestern Ontario types (Sims et al. 1989 and 1997, Harris et al. 1996). Care was taken not to over-emphasize local variations found at Voyageurs compared to more extensive information compiled at the state or regional level. Nevertheless, several types in the USNVC were revised based on these analyses. Plot summaries were produced for each type.

Taxonomic_Classification:
Taxon_Rank_Name: Kingdom
Taxon_Rank_Value: Plantae

Access_Constraints: None

Use_Constraints:
Those using the database should understand the data and determine for themselves the fitness of the data prior to use. For publication and dissemination, citations or credit should be given to the U.S. Geological Survey Center for Biological Informatics, the National Park Service, and the U.S. Geological Survey Upper Midwest Environmental Sciences Center. The Nature Conservancy and their affiliates (Association for Biodiversity Information and Minnesota County Biological Survey of the Minnesota Department of Natural Resources) should be given credit for ecological support.

Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: USGS-NPS Vegetation Mapping Program Coordinator
Contact_Organization: U.S. Geological Survey, Center for Biological Informatics
Contact_Address:
Address_Type: mailing and physical address
Address:
U.S. Geological Survey, Center for Biological Informatics, MS 302, Room 8000, Building 810, Denver Federal Center
City: Denver
State_or_Province: Colorado
Postal_Code: 80225
Contact_Voice_Telephone: (303) 202-4220
Contact_Facsimile_Telephone: 303-202-4229
Contact_Facsimile_Telephone: 303-202-4219 (org)
Contact_Electronic_Mail_Address: gs-b-npsveg@usgs.gov

Browse_Graphic:
Browse_Graphic_File_Name: http://biology.usgs.gov/npsveg/voya/images/vegmap.jpg
Browse_Graphic_File_Description:
Graphic file showing vegetation distribution of Voyagerus NP and environs, by ecological subgroups. Low resolution for web browser - 816 x 528 pixel size, 311 KB file size.
Browse_Graphic_File_Type: JPG

Browse_Graphic:
Browse_Graphic_File_Name: http://biology.usgs.gov/npsveg/voya/images/vegmap_large.jpg
Browse_Graphic_File_Description:
Graphic file showing vegetation distribution of Voyagerus NP and environs, by ecological subgroups. High resolution for presentation – 3263 x 2111 pixel size, 3.6 MB file size.
Browse_Graphic_File_Type: JPG

Data_Set_Credit: USGS UMESC, TNC and their affiliates (ABI and MCBS)

Native_Data_Set_Environment: UNIX-ARC/INFO

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Based on results of a thematic accuracy assessment, the estimated overall accuracy for the vegetation map units is 82.4%.
Logical_Consistency_Report:
All polygon features were checked for topology and existence of label points using ArcInfo. Each polygon begins and ends at the same point with the node feature. All nodes were checked for error so that there are no dangling features. There are no duplicate lines or polygons. All nodes were snapped together and polygons closed based on a specified tolerance. The tests for logical consistency were performed in ArcInfo.
Completeness_Report:
All data within the bounding coordinates are complete with polygons representing ground features at the time of aerial photographs. Each polygon is represented with a single label in the form of a code that represents the map unit and appropriate physiognomic descriptors. A .5 hectare (1.2 acre) minimum mapping unit was applied to all map units, except for the small island categories which are mapped to .1 hectares (.25 acres).
Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
The portion of the spatial database that was produced using the USGS 1:12,000-scale orthophoto base maps (hard copy maps plotted from 3.75-minute DOQ's) has a positional accuracy meeting U.S. National Map Accuracy Standards. The portion of the spatial database that was produced using the OBM 1:20,000-scale topographic maps (10 meter contour interval) has a positional accuracy of 1 meter for well-defined features. With most features within the project area not being well-defined (e.g. large forested and wetland areas), positional accuracy is uncertain.
Lineage:
Source_Information:
Source_Citation:
Citation_Information:
Originator: KBM, Inc.
Publication_Date: 1995/1996
Title:
Voyageurs National Park - Fall 1995/1996 Color Infrared Aerial Photography
Geospatial_Data_Presentation_Form: aerial photography
Series_Information:
Series_Name: USGS-NPS Vegetation Mapping Program
Issue_Identification: Voyageurs NP Vegetation Mapping Project
Publication_Information:
Publication_Place: 1604 S. Washington St., Grand Forks, North Dakota
Publisher: KBM, Inc.
Other_Citation_Details:
A total of 782 color infrared aerial photographs (1:15,840-scale) were collected for the Voyageurs NP Vegetation Mapping Project, USGS-NPS Vegetation Mapping Program. The photographs cover the entire Park and extended environs. Digital flight line index coverages of the aerial photographs were produced by the U.S. Geological Survey Upper Midwest Environmental Sciences Center and are available on the project's CD-ROM.
Source_Scale_Denominator: 15840
Type_of_Source_Media: aerial photographs
Source_Time_Period_of_Content:
Time_Period_Information:
Multiple_Dates/Times:
Single_Date/Time:
Calendar_Date: 19950927
Single_Date/Time:
Calendar_Date: 19960913

Single_Date/Time:
Calendar_Date: 19960914
Single_Date/Time:
Calendar_Date: 19961003
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: VOYA 1995/1996 CIR Aerial Photographs
Source_Contribution: None
Source_Information:
Source_Citation:
Citation_Information:
Originator: U.S. Geological Survey
Publication_Date: 1991-1992
Title: 3.75-minute Digital Orthophoto Quadrangles
Geospatial_Data_Presentation_Form: orhtorectified aerial photographs
Other_Citation_Details:
Black & white (gray-scale) orthorectified images derived from aerial photographs taken May 1991 and May 1992. Projection is in Universal Transverse Mercator, Zone 15, and datum in North American Datum of 1983, Geodedic Reference System 80 spheroid.
Source_Scale_Denominator: 12000
Type_of_Source_Media: photographs
Source_Time_Period_of_Content:
Time_Period_Information:
Multiple_Dates/Times:
Single_Date/Time:
Calendar_Date: 199105
Single_Date/Time:
Calendar_Date: 199205
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: USGS 3.75-minute DOQ
Source_Contribution: None
Source_Information:
Source_Citation:
Citation_Information:
Originator:
Provincial Mapping Office, Ontario Ministry of Natural Resources
Publication_Date: 1993
Title: Ontario Basic Mapping Series
Geospatial_Data_Presentation_Form: topography paper map
Publication_Information:
Publication_Place: Toronto, Ontario, Canada
Publisher: Ontario Ministry of Natural Resources
Other_Citation_Details:
Used selected map tiles for portions within the project boundary that were not covered by USGS DOQ base maps. Hard copy (paper) topographic maps are 1:20,000-scale, Universal Transverse Mercator, Zone 15, North American Datum of 1927. Air photo source 1983, map published 1993. Map base by Land and Resource Information Branch.
Type_of_Source_Media: paper
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 1993
Source_Currentness_Reference: the publication date
Source_Citation_Abbreviation: OBM
Source_Contribution: None
Source_Information:
Source_Citation:

Citation_Information:
Originator:
U.S. Geological Survey, Upper Midwest Environmental Sciences Center
Publication_Date: 200003
Title:
Map Units for the Voyageurs National Park Vegetation Mapping Project
Geospatial_Data_Presentation_Form: Map unit codes and name for Voyageurs National Park
Series_Information:
Series_Name: USGS-NPS Vegetation Mapping Program
Issue_Identification: Voyageurs NP Vegetation Mapping Project
Publication_Information:
Publication_Place: La Crosse, Wisconsin
Publisher: U.S. Geological Survey, Upper Midwest Environmental Sciences Center
Other_Citation_Details:
Map unit codes and name descriptions developed specifically for the Voyageurs NP Vegetation Mapping Project. Includes crosswalk to U.S. National Vegetation Classification floristic and physiognomic levels (names and codes), Ecological Groups (subgroups), Minnesota Natural Community Classification, NW Ontario Forest Ecosystem Classification and Wetland Ecosystem Classification systems, and U.S. Geological Survey Land Use/Land Cover classification system (level 2). Microsoft (R) Excel 97 Workbook files [voya_mapunit_crosswalk.xls] for full crosswalk, and [voya_mapunit.xls] for condensed crosswalk are available on the project's CD-ROM.
Type_of_Source_Media: digital file
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 200003
Source_Currentness_Reference: final version
Source_Citation_Abbreviation: VOYA Map Units
Source_Contribution: None
Process_Step:
Process_Description:
INTRODUCTION & AERIAL PHOTOGRAPHY: The vegetation spatial database coverage is of Voyageurs National Park and extended environs, and covers 156,866 hectares (387,674 acres). Voyageurs National Park comprises 88,244 hectares (218,055 acres) of the total coverage area (56%). A total of 782 CIR aerial photographs were collected for the project at a scale of 1:15,840. The aerial photograph mission began late September 1995 with the collection of 111 photos, covering much of the northern one-third of the project area. The photo mission was completed late September and early October 1996 with the collection of an additional 671 aerial photographs. A total of 510 aerial photographs were used for mapping. The spatial database reflects conditions that existed at the time the photos were collected.
Process_Date: 1995-1996
Process_Step:
Process_Description:
FIELD RECONNAISSANCE & PHOTO INTERPRETATION: Prior to photo interpretation, field reconnaissance was performed throughout the 1996 field season by the photo interpretation team to learn, test, and verify photo signatures to establish a map classification. Efforts were concentrated in the northern one-third of the project area for which a set of photographs had already been acquired. Ecologists intermittently assisted to assure correct field calls and to verify additional vegetation types as they were encountered. By the end of the 1996 field season, mapping protocols were sufficiently stabilized to permit the aerial photo interpretation team to begin delineating polygons across the northern one-third of the project area. During the 1997 field season, field reconnaissance activities continued, focusing on the southern two-thirds of the project area with an emphasis on photo signatures not readily observed the prior year. Throughout this field process, map unit classes were developed, and a fuller understanding of their linkage to vegetation types was strengthened. Photo interpretation was performed using the 1995/1996 CIR film transparencies (1:15,840-scale). The photographs were cut from rolls and covered with

clear acetate overlays. The overlays were registered to the photos. Ground features were interpreted and delineated onto the photo overlays using a Bausch and Lomb Zoom 240 stereoscope over a light table. Each photograph was viewed with its matching stereo pairs so images could be seen in 3-dimensions. To minimize edge distortion, interpretation was focused towards the center of each photograph. Texture, height, pattern, life form, and position in the landscape were all used in the decision process of delineating polygons and assigning map unit codes. Appropriate physiognomic modifiers were added in conjunction with the map unit attribute. An ancillary set of October 1988 CIR aerial photographs (1:12,000-scale) was used to assist in the interpretation process. The 1988 photo set effectively captured fall colors in leaf canopies and revealed distinctions not apparent on the 1995/1996 photo set. A total of 509 aerial photographs were interpreted to produce the spatial coverage.

Process_Date: 1996-1998

Process_Step:

Process_Description:

AUTOMATION & SPATIAL COVERAGE: Bausch and Lomb zoom transfer scopes were used to transfer photo interpreted data to geo-referenced base maps. The transfer process removed much of the aerial photograph's inherent distortion and also tied the interpreted data to real-world coordinates so it could be digitally automated. A total of 51 USGS 3.75-minute DOQ's were used to plot hard copy (film acetate) orthophoto base maps at a scale of 1:12,000. About 92% of the project area was produced with DOQ-based maps, covering the Voyageurs National Park, all the environs area within USA, and portions of the environs area within Canada. For portions of Canada not covered by DOQ's, OBM topographic paper maps at a scale of 1:20,000 were used. The polygons were manually transferred to overlays that were registered to the base maps. Map unit attributes and appropriate physiognomic modifier codes were added to a second overlay that was positioned over the polygon overlay. The overlays were subsequently rechecked for accuracy. Each overlay of transferred data was scanned using a large format sheet fed scanner at a resolution of 400 dots per inch. The resulting Tagged Image File Format images were then converted to a grid using ArcInfo (Version 7.2.1 Patch 2). For data produced with the DOQ base maps, the converted grid was projected to Universal Transverse Mercator (UTM), Zone 15, with datum in North American Datum of 1983 (NAD83). For data produced with the OBM base maps, the converted grid was projected to UTM, Zone 15, with datum in North American Datum of 1927 (NAD27) and later converted to NAD83 once all OBM-based digital coverages were produced and joined. Each individual grid was transformed to a geo-referenced boundary coverage to digitally reference the data to real-world coordinates. In ArcTools, the ArcScan utility was used to trace the referenced polygon data producing an ArcInfo coverage. Each intermediate coverage was edited for errors, assigned attributes to polygons, checked against the hand-transferred overlays for line and attribute errors, and finally joined to produce a seamless spatial database coverage of the vegetation map. The look up table (LUT) was originally produced in spreadsheet format (dBASE IV), and then converted to an ArcInfo table using ArcInfo (Version 8.0.2). The table was merged with the spatial coverage using MAP_CODE as the common attribute item. The merged LUT contains numerous items which provides a set of information for each polygon. For the list of LUT items, refer to the Entity and Attribute Information's Entity and Attribute Overview section within this a metadata report. The finished coverage is single, seamless spatial database of the entire project area. Because 2 procedures were used in the automation process (DOQ-based maps in NAD83, and OBM-based maps in NAD27 later converted to NAD83), the vegetation database was also preserved as 2 separate coverages.

Process_Date: 1996-2000

Process_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Kevin D. Hop

Contact_Organization:

U.S. Geological Survey, Upper Midwest Environmental Sciences Center

Contact_Position: Project Team Leader - Biologist (Remote Sensing)

Contact_Address:

Address_Type: mailing and physical address

Address:

U.S. Geological Survey, Upper Midwest Environmental Sciences Center, 575 Lester Avenue
City: Onalaska
State_or_Province: Wisconsin
Postal_Code: 54650
Contact_Address:
Address_Type: organization address
Address: 2630 Fanta Reed Road
City: La Crosse
State_or_Province: Wisconsin
Postal_Code: 54603
Contact_Voice_Telephone: (608) 783-7550 ext 46
Contact_Voice_Telephone: (608) 783-6451 (organization)
Contact_Facsimile_Telephone: (608) 783-8058
Contact_Facsimile_Telephone: (608) 783-6066 (org)
Contact_Electronic_Mail_Address: kevin_hop@usgs.gov

Spatial_Data_Organization_Information:
Indirect_Spatial_Reference:
Voyageurs National Park is located in northern Minnesota, with the northern extent of the Park bordering Ontario, Canada. The northwest corner of the Park is 18 miles east of International Falls, Minnesota. The southwest corner of the Park is adjacent the Boundary Waters Canoe Area, Superior National Forest.
Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:
SDTS_Terms_Description:
SDTS_Point_and_Vector_Object_Type: Label point

Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Planar:
Grid_Coordinate_System:
Grid_Coordinate_System_Name: Universal Transverse Mercator
Universal_Transverse_Mercator:
UTM_Zone_Number: 15
Transverse_Mercator:
Scale_Factor_at_Central_Meridian: 0.9996
Longitude_of_Central_Meridian: -93
Latitude_of_Projection_Origin: 0
False_Easting: 500000
False_Northing: 0
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 1
Ordinate_Resolution: 1
Planar_Distance_Units: meters
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1983
Ellipsoid_Name: Geodedic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257

Entity_and_Attribute_Information:
Detailed_Description:
Entity_Type:
Entity_Type_Label: BSB

Entity_Type_Definition: Black Spruce Bog
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: LBC
Entity_Type_Definition: Black Spruce/Leatherleaf Semi-treed Bog
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: LB
Entity_Type_Definition: Leatherleaf Bog
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BBX
Entity_Type_Definition: Beaver Basin Break-up Mosaic
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BBSF
Entity_Type_Definition: Bog Birch-Willow Shore Fen
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: LSF
Entity_Type_Definition: Leatherleaf-Sweet Gale Shore Fen
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: TF
Entity_Type_Definition: Tamarack Scrub Poor Fen
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SPF
Entity_Type_Definition: Northern Sedge Poor Fen
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BJ
Entity_Type_Definition: Canada Bluejoint Eastern Meadow
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SMX
Entity_Type_Definition: Wet Meadow/Fen Mosaic/Complex
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: PM
Entity_Type_Definition: Eastern Reed Marsh
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BM
Entity_Type_Definition: Freshwater Bulrush Marsh

Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: CM
Entity_Type_Definition: Midwest Cattail Deep Marsh
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WRM
Entity_Type_Definition: Wild Rice Marsh
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: DMX
Entity_Type_Definition: Deep Marsh Mosaic/Complex
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: PW
Entity_Type_Definition: Midwest Pondweed Submerged Aquatic Wetland
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WL
Entity_Type_Definition: Northern Water Lily Aquatic Wetland
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BA
Entity_Type_Definition: Black Ash-Mixed Hardwood Swamp
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WCBA
Entity_Type_Definition: White Cedar-Black Ash Swamp
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BSAS
Entity_Type_Definition: Black Spruce/Alder Rich Swamp
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: TA
Entity_Type_Definition: Northern Tamarack Rich Swamp
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WCS
Entity_Type_Definition:
White Cedar-(Mixed Conifer)/Alder Swamp (rich soil phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WCT
Entity_Type_Definition:

White Cedar-(Mixed Conifer)/Alder Swamp (peatland phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BSL
Entity_Type_Definition:
Black Spruce/Labrador Tea Poor Swamp (evergreen
phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BST
Entity_Type_Definition: Black Spruce/Labrador Tea Poor Swamp (mixed phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: DS
Entity_Type_Definition: Dogwood-Pussy Willow Swamp
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: AS
Entity_Type_Definition: Speckled Alder Swamp
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: JPW
Entity_Type_Definition: Boreal Pine Rocky Woodland (jack pine phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: JPM
Entity_Type_Definition: Boreal Pine Rocky Woodland (mixed pine phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: JPL
Entity_Type_Definition: Jack Pine/Lichen Rocky Barrens
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: ABW
Entity_Type_Definition: Mixed Aspen Rocky Woodland
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: OW
Entity_Type_Definition:
Northern Pin Oak-Bur Oak-(Jack Pine) Rocky Woodland (deciduous phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: JPOM
Entity_Type_Definition:
Northern Pin Oak-Bur Oak-(Jack Pine) Rocky Woodland (jack pine-oak phase)
Entity_Type_Definition_Source: Map Unit

Detailed_Description:
Entity_Type:
Entity_Type_Label: MPHW
Entity_Type_Definition:
Northern Pin Oak-Bur Oak-(Jack Pine) Rocky Woodland (mixed pine-oak phase)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: UBS
Entity_Type_Definition: Boreal Hazelnut-Serviceberry Rocky Shrubland
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: MGF
Entity_Type_Definition: Poverty Grass Granite Barrens
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WCU
Entity_Type_Definition: White Cedar-Boreal Conifer Mesic Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WCA
Entity_Type_Definition: White Cedar-Yellow Birch Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: JPAX
Entity_Type_Definition: Jack Pine-Aspen Forest Mosaic
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: JPF
Entity_Type_Definition: Jack Pine/Balsam Fir Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WRPA
Entity_Type_Definition: White Pine-Red Pine-Quaking Aspen-Birch Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: RP
Entity_Type_Definition: Red Pine/Blueberry Dry Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WP
Entity_Type_Definition: White Pine/Mountain Maple Mesic Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SFA
Entity_Type_Definition: Spruce-Fir-Aspen Forest
Entity_Type_Definition_Source: Map Unit

Detailed_Description:
Entity_Type:
Entity_Type_Label: BSF
Entity_Type_Definition: Black Spruce/Feathermoss Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SF
Entity_Type_Definition: Spruce-Fir/Mountain Maple Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: AB
Entity_Type_Definition: Quaking Aspen-Paper Birch Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: PB
Entity_Type_Definition: Paper Birch/Fir Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: AL
Entity_Type_Definition: Trembling Aspen-Balsam Poplar Lowland Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: BO
Entity_Type_Definition: Northern Bur Oak Mesic Forest
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: EP
Entity_Type_Definition: Evergreen Plantation
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: PGCH
Entity_Type_Definition: Perennial Grass Crops (hay, pastureland)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: PGCS
Entity_Type_Definition:
Perennial Grass Crops with Sparse Shrubs (hay, pastureland)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: ACP
Entity_Type_Definition: Cropland and Pasture
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: ARB
Entity_Type_Definition: Other Agricultural Land
Entity_Type_Definition_Source: Map Unit

Detailed_Description:
Entity_Type:
Entity_Type_Label: BLQ
Entity_Type_Definition: Strip Mines, Quarries, and Gravel Pits
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: UC
Entity_Type_Definition: Commercial and Services
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: UR
Entity_Type_Definition: Residential
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: UT
Entity_Type_Definition: Transportation, Communications, and Utilities
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WLK
Entity_Type_Definition: Lakes (>16 h)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WS
Entity_Type_Definition: Streams and Canals
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SIG
Entity_Type_Definition: Small Island with Grass (0.1 - 0.5 h)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SIR
Entity_Type_Definition: Small Island with Rock (0.1 - 0.5 h)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SIS
Entity_Type_Definition: Small Island with Shrubs (0.1 - 0.5 h)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: SIT
Entity_Type_Definition: Small Island with Trees (0.1 - 0.5 h)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: WBP
Entity_Type_Definition: Water-Beaver Pond (<10% vegetated)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:

Entity_Type:
Entity_Type_Label: WNP
Entity_Type_Definition: Water-Natural Pond (<16 ha, <10% vegetated)
Entity_Type_Definition_Source: Map Unit
Detailed_Description:
Entity_Type:
Entity_Type_Label: 1
Entity_Type_Definition: Closed Canopy/Continuous (60-100% cover)
Entity_Type_Definition_Source: Coverage Density
Detailed_Description:
Entity_Type:
Entity_Type_Label: 2
Entity_Type_Definition: Open Canopy/Discontinuous (25-60% cover)
Entity_Type_Definition_Source: Coverage Density
Detailed_Description:
Entity_Type:
Entity_Type_Label: 3
Entity_Type_Definition: Dispersed-Sparse Canopy (10-25% cover)
Entity_Type_Definition_Source: Coverage Density
Detailed_Description:
Entity_Type:
Entity_Type_Label: A
Entity_Type_Definition: Evenly Dispersed
Entity_Type_Definition_Source: Coverage Pattern
Detailed_Description:
Entity_Type:
Entity_Type_Label: B
Entity_Type_Definition: Clumped/Bunched
Entity_Type_Definition_Source: Coverage Pattern
Detailed_Description:
Entity_Type:
Entity_Type_Label: C
Entity_Type_Definition: Gradational/Transitional
Entity_Type_Definition_Source: Coverage Pattern
Detailed_Description:
Entity_Type:
Entity_Type_Label: D
Entity_Type_Definition: Regularly Alternating
Entity_Type_Definition_Source: Coverage Pattern
Detailed_Description:
Entity_Type:
Entity_Type_Label: 1
Entity_Type_Definition: 30-50 meters (98-162 feet)
Entity_Type_Definition_Source: Height
Detailed_Description:
Entity_Type:
Entity_Type_Label: 2
Entity_Type_Definition: 20-30 meters (65-98 feet)
Entity_Type_Definition_Source: Height
Detailed_Description:
Entity_Type:
Entity_Type_Label: 3
Entity_Type_Definition: 12-20 meters (40-65 feet)
Entity_Type_Definition_Source: Height
Detailed_Description:
Entity_Type:

Entity_Type_Label: 4
Entity_Type_Definition: 5-12 meters (16-40 feet)
Entity_Type_Definition_Source: Height
Detailed_Description:
Entity_Type:
Entity_Type_Label: 5
Entity_Type_Definition: 0.5-5 meters (1.5-16 feet)
Entity_Type_Definition_Source: Height
Detailed_Description:
Entity_Type:
Entity_Type_Label: 6
Entity_Type_Definition: <0.5 meters (<1.5 feet)
Entity_Type_Definition_Source: Height
Detailed_Description:
Entity_Type:
Entity_Type_Label: D
Entity_Type_Definition:
Deciduous 60-75% dominance of existing tree coverage, evergreen 25-40%
Entity_Type_Definition_Source: Dominance/Co-dominance
Detailed_Description:
Entity_Type:
Entity_Type_Label: E
Entity_Type_Definition:
Evergreen 60-75% dominance of existing tree coverage, deciduous 25-40%
Entity_Type_Definition_Source: Dominance/Co-dominance
Detailed_Description:
Entity_Type:
Entity_Type_Label: M
Entity_Type_Definition:
Deciduous/Evergreen 40-60% co-dominance of existing tree coverage
Entity_Type_Definition_Source: Dominance/Co-dominance
Overview_Description:
Entity_and_Attribute_Overview:
Items within the spatial database LUT in addition to the ArcInfo default items (e.g. area, perimeter) include: 1) CODE_MOD - Map Unit Code with all applicable physiognomic feature modifiers, 2) MAP_CODE - Map Unit Code, 3) MAP_DESC - Map Unit Description Name, 4) DENS_MOD - Coverage Density Modifier (applies to all vegetation map units), 5) PTRN_MOD - Coverage Pattern Modifier (applies to all vegetation map units), 6) HT_MOD - Height Modifier (applies to woody terrestrial vegetation map units), 7) DOM_MOD - Dominance/Co-dominance Modifier (applies to mixed conifer/deciduous woody terrestrial vegetation map units), 8) ASSN_NAME - Project Global Community Name (USNVC Association), 9) ASSN_CNAME - Project Global Common Community Name (synonym name of USNVC Association), 10) ASSN_CEGL - Community Element Global Code (Elcode link to USNVC Association), 11) ALL_NAME - USNVC Alliance Name, 12) ALL_CNAME - USNVC Common Alliance Name, 13) ALL_KEY - Alliance Key (code representing USNVC Alliance), 14) NVCS_CODE - USNVC Code (to Formation level), 15) CLASS - USNVC Formation Class (Class name & code), 16) SUBCLASS - USNVC Formation Subclass (Subclass name & code), 17) GROUP - USNVC Formation Group (Group name & code), 18) SUBGROUP - USNVC Formation Subgroup (Subgroup name & code), 19) FORMATION - USNVC Formation (Formation name & code), 20) ECO_GROUP - Ecological Group (groups of vegetation types sharing ecological processes), 21) ECO_SUBGRP - Ecological Subgroup (subgroups of vegetation types sharing ecological processes), 22) MNCC - Minnesota Natural Community Classification, 23) NWON_FEC - NW Ontario Forest Ecosystem Classification, 24) NWON_WET - NW Ontario Wetland Ecosystem Classification 25) LUC_II - USGS Land Use and Land Cover Classification System (level 2), 26) COMMENT1 - General description about the map unit, and 27) COMMENT2 - General comment of how the map unit relates to other map units.
Entity_and_Attribute_Detail_Citation:
Map Unit Codes and Map Unit Description Names (CODE_MOD, MAP_CODE, & MAP_DESC): Map Units for

the Voyageurs National Park Vegetation Mapping Project. March 2000. U.S. Geological Survey Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin.
Entity_and_Attribute_Detail_Citation:
Physiognomic Modifiers - Coverage Density, Coverage Pattern, Height, and Dominance/Co-dominance (DENS_MOD, PTRN_MOD, HT_MOD, & DOM_MOD): Physiognomic modifiers added to map units (when applicable) to describe structural features. Original source for Coverage Density, Coverage Pattern, and Height is cited to Aerial Information Systems, Inc. 1995. Standard Interpretive Conventions (Viewgraph 3). Redlands, California. Height categories were modified to accomodate park specific needs. Dominance/Co-dominance is project derived.
Entity_and_Attribute_Detail_Citation:
Project Global Community Names, Project Global Common Community Names, Community Element Global Codes, Alliance Name, Common Alliance Name, Alliance Key, USNVC Code, USNVC Phyisognomic Formation levels Class, Subclass, Group, Subgroup, and Formation (ASSN_NAME, ASSN_CNAME, ASSN_CEGL, ALL_NAME, ALL_CNAME, ALL_KEY, NVCS_CODE, CLASS, SUBCLASS, GROUP, SUBGROUP, & FORMATION): Anderson, M., P. Bourgeron, M. T. Bryer, R. Crawford, L. Engelking, D. Faber-Langendoen, M. Gallyoun, K. Goodin, D. H. Grossman, S. Landaal, K. Metzler, K. D. Patterson, M. Pyne, M. Reid, L. Sneddon, and A. S. Weakley. 1998. International classification of ecological communities: terrestrial vegetation of the United States. Volume II. The National Vegetation Classification System: list of types. The Nature Conservancy, Arlington, Virginia, USA.
Entity_and_Attribute_Detail_Citation:
Ecological Groups and Ecological Subgroups (ECO_GROUP & ECO_SUBGRP): Faber-Langendoen, D. (editor). 2000 (in press). International classification of ecological communities: terrestrial vegetation of the Midwestern United States. The Nature Conservancy, Midwest Conservation Science Department, Minneapolis, MN.
Entity_and_Attribute_Detail_Citation:
Minnesota Natural Community Classification (MNCC): Minnesota Department of Natural Resources, Natural Heritage Program. 1993. Minnesota's Native Vegetation: A Key to Natural Communities (version 1.5).
Entity_and_Attribute_Detail_Citation:
NW Ontario Forest Ecosystem Classification (NWON_FEC): Sims, R.A., W.D. Towill, K.A. Baldwin, P. Uhlig and G.M. Wickware. 1997. Field guide to the forest ecosystem classification for northwestern Ontario. Ont. Min. Natur. Resour., Northwest Sci. & Technol. Thunder Bay, Ont. Field Guide FG-03. 176 pp.
Entity_and_Attribute_Detail_Citation:
NW Ontario Wetland Ecosystem Classification (NWON_WET): Harris, A.G., S.C. McMurray, P.W.C. Uhlig, J.K. Jeglum, R.F. Foster and G.D. Racey. 1996. Field guide to the wetland ecosystem classification for northwestern Onatrio. Ont. Min. Nat. Resour., Northwest Sci. & Technol. Thunder Bay, Ont. Field Guide FG-01. 74 pp. + Append.
Entity_and_Attribute_Detail_Citation:
USGS Land Use and Land Cover Classification (LUC_II): Anderson, J. R., E. Hardy, J. Roach, and R. Witter. 1976. A Land Use and Land Cover Classification System for Use with Remote Sensor Data. Geological Survey Professional paper 964. U.S. Government Printing Office, Washington.
Note: Crosswalk to level 2 for all map units.

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Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: HTML
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: http://biology.usgs.gov/npsveg/voya/index.html#geospatial_veg_info
Fees: None

Metadata_Reference_Information:
Metadata_Date: 200102
Metadata_Review_Date: 20060907
Metadata_Contact:
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Contact_Organization_Primary:
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Metadata_Standard_Name: FGDC-STD-001.1-1999 Content Standard for Digital Geospatial Metadata, 1998 Part 1: Biological Data Profile, 1999
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Extensions:
Online_Linkage: http://biology.usgs.gov/fgdc.bio/bionwext.txt
Profile_Name: Biological Data Profile FGDC-STD-001.1-1999